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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/508,943	10/01/2004	Mitsuhiko Sakakibara	259789US0PCT	7510
22850	7590	06/27/2007		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER YAMNITZKY, MARIE ROSE	
			ART UNIT 1774	PAPER NUMBER
			NOTIFICATION DATE 06/27/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/508,943	Applicant(s) SAKAKIBARA ET AL.	
	Examiner Marie R. Yamnitzky	Art Unit 1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 Oct 2004, 23 Nov 2004 and 28 Jul 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>23 Nov 2004 & 28 Jul 2005</u> . | 6) <input type="checkbox"/> Other: _____ |

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1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it is too long, it is not in the form of a single paragraph, and it includes phrases which can be implied. Correction is required. See MPEP § 608.01(b).

2. Claim 6 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form, or rewrite the claim in independent form.

Claim 6 is in improper dependent form in referring to only a portion of the subject matter of claim 1 (i.e. the structural unit represented by the general formula (1)). This objection could be overcome by changing "a phosphorescent agent" in line 1 of claim 6 to --the phosphorescent agent according to claim 1--.

3. Claims 1 and 6 are objected to because of the following informalities: Claims 1 and 6 are not in the form of a single sentence. Appropriate correction is required.

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4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3 and 7-9 are rejected under 35 U.S.C. 102(a) or 102(e) as being anticipated by Takeuchi et al. (WO 03/001616), hereinafter WO '616.

See the entire document. In particular, see Fig. 1, page 13, line 11-p. 14, l. 4, p. 14, l. 16-p. 15, l. 10, p. 17, l. 21-22, p. 37, l. 10-p. 45, l. 7, p. 61, l. 8-p. 69, l. 2, p. 84, l. 18-p. 85, l. 22, p. 95, l. 12-p. 96, l. 3, p. 113, l. 3-p. 114, l. 20, p. 128, l. 7-p. 130, l. 8, p. 147, l. 11- p. 148, l. 11, p. 151, l. 9-p. 152, l. 19 and p. 155, l. 4-14.

A polymerizable compound represented by formula (D-14) as shown on p. 44 wherein Y^{1D} is a styryl group as taught at p. 44, l. 13-15, or a polymerizable compound represented by formula (F-12) as shown on p. 67 wherein Y^{1F} is a styryl group as taught at p. 68, l. 3-5, provides a phosphorescent agent comprising a polymer having a structural unit represented by general formula (1) as defined in present claim 1 wherein X^1 represents a phenylene group and q is 0.

A polymerizable compound represented by formula (D-14) as shown on p. 44 wherein Y^{1D} is an acrylate group as taught at p. 44, l. 16-18 provides a phosphorescent agent comprising

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a polymer having a structural unit represented by general formula (1) as defined in present claim 1 wherein X^1 represents a carbonyloxy group and q is 0.

Regarding present claims 2 and 3, as taught in the paragraph bridging pages 95 and 96, the polymeric light emitting material may be a copolymer made by copolymerizing a light emitting compound having a polymerizable functional group (the compounds represented by formula (D-14) or (F-12) being examples of such compounds) with an electron transporting compound having a polymerizable functional group and/or a hole transporting compound having a polymerizable functional group.

Regarding present claims 7-9, the polymeric light emitting materials of WO '616 are taught for use in the light emitting layer of an organic electroluminescent device. The device may be made by a solution coating method. For example, see p. 151, l. 9-p. 152, l. 12 and p. 155, l. 4-14.

6. WO '616 is available under 35 U.S.C. 102(e) as of at least June 20, 2002, having been published in English and designating the U.S. The examiner notes that the 102(e) date may actually be earlier than June 20, 2002. The PCT application claims priority of several U.S. provisional applications filed in 2001. The examiner has not currently reviewed these provisional applications to determine which, if any, support the referenced portions of WO '616 since the filing date of the PCT application predates present applicant's earliest claim for foreign priority.

WO '616 is also available under 35 U.S.C. 102(a) as of January 03, 2003.

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WO '616 was cited by applicant with the IDS filed November 23, 2004, but only a copy of the cover page was supplied. While this reference is listed on the International Search Report for the PCT application corresponding to the present application, the only copies that were received for the references listed on the ISR are the copies provided with the IDS filed November 23, 2004. WO '616 is over 300 pages long. The examiner presumes that applicant has a full copy of the document and therefore has not provided a copy with this action. If applicant does not have a full copy, one should be viewable by applicant/applicant's representative through the Public side of PAIR in Application No. 10/407,438, now U.S. Patent No. 7,108,924.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (WO 03/001616) as applied to claims 1-3 and 7-9 above, and for the further reasons set forth below.

Phosphorescent agents according to present claim 1 comprising a polymer having a structural unit represented by general formula (1) wherein X¹ represents a phenylene group or a carbonyloxy group and q is 0 are anticipated by the prior art.

Similar phosphorescent agents comprising a polymer having a structural unit represented by general formula (1) wherein X^1 represents a phenylene group or a carbonyloxy group, X^2 represents an alkylene group and q is 1 would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention given the prior art disclosure of position isomers thereof. For example, see formulae (D-1) on p. 38, (D-4) and (D-5) on p. 40, (D-11) on p. 43, and (D-14) on p. 44. Formulae (D-4), (D-5), (D-11) and (D-14) define subsets of polymerizable compounds within the scope of polymerizable compounds of formula (D-1). Formula (D-14) is capable of providing a polymer having a structural unit of present general formula (1) whereas formulae (D-4), (D-5) and (D-11) provide position isomers thereof, having the present $-X^1-(X^2)_q-$ linkage position switched with one of present R^1 and R^2 . Formula (D-4) provides a polymer having a structural unit that is a position isomer of present formula (1) wherein X^1 represents a phenylene group, X^2 represents an alkylene group and q is 1. Formulae (D-5) and (D-11) provide polymers having a structural unit that is a position isomer of present formula (1) wherein X^1 represents a carbonyloxy group, X^2 represents an alkylene group and q is 1. Given that the polymerizable group may be at any of X^{1D} , Y^{1D} and Z^{1D} in prior art formula (D-1), and given that (D-4), (D-5), (D-11) and (D-14) are all subsets of formula (D-1), it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make polymers using a polymerizable compound of formula (D-14) wherein Y^{1D} represents a polymerizable functional group such as in the polymerizable compounds of formulae (D-4), (D-5) and (D-11). One of ordinary skill in the art at the time of the invention would have reasonably expected that polymerizable functional groups suitable for X^{1D} and Z^{1D} would be suitable for

Y^{1D}. Further, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to use the resultant polymers in a light emitting layer of an organic electroluminescent device as taught by the prior art.

With respect to present claims 2-5, the polymeric light emitting material may be a copolymer as taught in the paragraph bridging pages 95 and 96. The paragraph bridging pages 147 and 148 teaches oxadiazole derivatives having a vinyl group as examples of polymerizable electron transporting compounds that may be copolymerized with the polymerizable light emitting compound. The prior art also provides specific examples of polymers that are copolymers of a polymerizable light emitting compound and a polymerizable hole transporting compound wherein the polymerizable hole transporting compound is a carbazole compound having a vinyl group. For example, see Example 67 on p. 281. (The copolymer of Example 67 is a position isomer of a copolymer as required by present claim 4 as dependent from claim 2, differing only in the relative positions of the present $-X^1-(X^2)_q-$ linkage and one of present R^1 and R^2 .) While the prior art does not provide any specific examples of a copolymer as defined by present claim 4 or 5, such copolymers would have been *prima facie* obvious to one of ordinary skill in the art given the prior art teachings that the polymers may be copolymers of polymerizable light emitting compounds, polymerizable electron transporting compounds and/or polymerizable hole transporting compounds, given the prior art disclosure of oxadiazole compounds having a vinyl group as suitable polymerizable electron transporting compounds, and given the prior art disclosure of a carbazole compound having a vinyl group as a suitable polymerizable hole transporting compound.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (WO 03/001616) as applied to claims 1-5 and 7-9 above, and further in view of Fryd et al. (US 6,869,693 B2).

WO '616 discloses and suggests various polymers having a structural unit represented by general formula (1) as defined in present claim 1. However, the production process used to make the polymers as disclosed in WO '616 differs from the production process set forth in present claim 6. WO '616 provides an organic metal complex monomer having a polymerizable functional group on a diketone ligand, and polymerizes the functional group so as to provide the polymeric backbone. In contrast, present claim 6 requires the formation of a polymeric backbone comprising diketone groups prior to complexation of the diketone groups with metal.

The present polymers are phosphorescent polymers having a metal complex in a side chain. It was known in the art at the time of the invention that phosphorescent polymers having a metal complex in a side chain could be made by forming a polymeric backbone comprising diketone groups, followed by complexation of the diketone groups with metal. For example, see the patent to Fryd et al., especially column 12, line 16-c. 14, l. 25. It would have been a *prima facie* obvious modification to one of ordinary skill in the art at the time of the invention to utilize alternative known methods, such as the methods disclosed by Fryd et al., to make phosphorescent polymers comprising repeating units such as in the phosphorescent polymers of WO '616.

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10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The cited references pertain to U.S. patent applications filed between the PCT filing date and the foreign priority filing date of the present application, and each discloses phosphorescent polymers that contain a repeating unit that is a position isomer of present formula (1), differing in the relative positions of the present $-X^1-(X^2)_q-$ linkage and one of present R^1 and R^2 . For example, in US 2003/0091862 A1 to Tokito et al., see paragraphs [0097]-[0098]. Tokito et al. is also of particular interest to present claims 2-5 (e.g. see paragraphs [0083]-[0084] and [0089]-[0092]). In US 2003/0186080 A1 to Kamatani et al., see the third formula on page 14. In US 7,108,924 B2 to Kamatani et al., see general formula (5) in column 6.

11. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
June 19, 2007



MARIE YAMNITZKY
PRIMARY EXAMINER

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